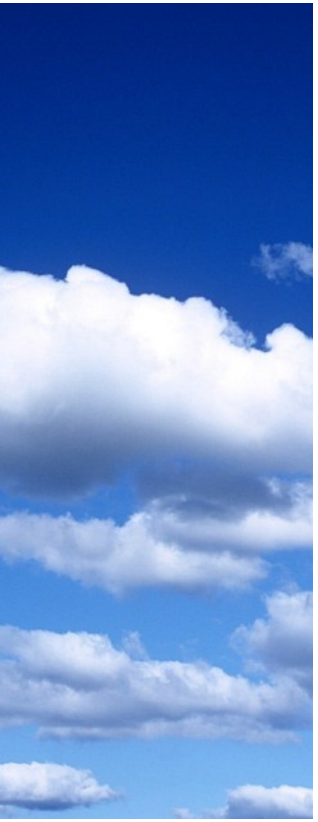


REVIEW OF SITE-RELATED GROUNDWATER REMEDIAL INVESTIGATION REPORT (RIR) ADDENDUM

RINGWOOD MINES/LANDFILL SUPERFUND SITE

FEBRUARY 8, 2018

533900

AGENDA

- Introduction to TASC
- RIR Addendum Summary
- TASC Comments
- Memorandum of Candidate Technologies

INTRODUCTION TO TASC

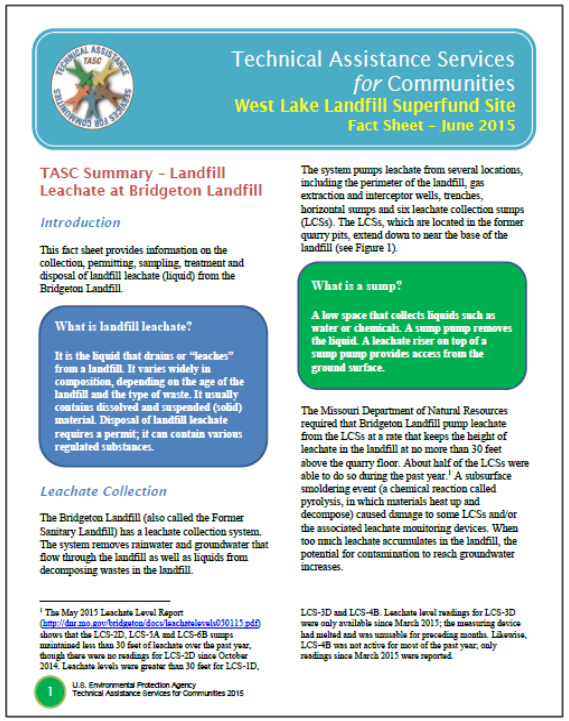
WHAT IS TASC?

- **T**echnical **A**ssistance **S**ervices for **C**ommunities
- One of several EPA-sponsored technical assistance programs
- Program goal: help people understand complex environmental issues to ensure meaningful community involvement in environmental decision-making
- Independent services provided under EPA contract with Skeo

TASC SERVICES

1. Meeting with communities to understand needs
2. Reviewing and explaining technical information
3. Developing and giving educational presentations
4. Developing information materials such as fact sheets and brochures
5. Developing and giving workshops and community training

EXAMPLES OF TASC PRODUCTS



Technical Assistance Services *for* Communities
West Lake Landfill Superfund Site
Fact Sheet – June 2015

TASC Summary – Landfill Leachate at Bridgeton Landfill

Introduction

This fact sheet provides information on the collection, permitting, sampling, treatment and disposal of landfill leachate (liquid) from the Bridgeton Landfill.

What is landfill leachate?

It is the liquid that drains or "leaches" from a landfill. It varies widely in composition, depending on the age of the landfill and the type of waste. It usually contains dissolved and suspended (solid) material. Disposal of landfill leachate requires a permit; it can contain various regulated substances.

Leachate Collection

The Bridgeton Landfill (also called the Former Sanitary Landfill) has a leachate collection system. The system removes rainwater and groundwater that flow through the landfill as well as liquids from decomposing wastes in the landfill.

The system pumps leachate from several locations, including the perimeter of the landfill, gas extraction and interceptor wells, trenches, horizontal sumps and six leachate collection sumps (LCSs). The LCSs, which are located in the former quarry pits, extend down to near the base of the landfill (see Figure 1).

What is a sump?

A low space that collects liquids such as water or chemicals. A sump pump removes the liquid. A leachate riser on top of a sump pump provides access from the ground surface.

The Missouri Department of Natural Resources required that Bridgeton Landfill pump leachate from the LCSs at a rate that keeps the height of leachate in the landfill at no more than 30 feet above the quarry floor. About half of the LCSs were able to do so during the past year.[1] A subsurface smoldering event (a chemical reaction called pyrolysis, in which materials heat up and decompose) caused damage to some LCSs and/or the associated leachate monitoring devices. When too much leachate accumulates in the landfill, the potential for contamination to reach groundwater increases.

LCS-3D and LCS-4B. Leachate level readings for LCS-3D were only available since March 2015; the measuring device had melted and was unusable for preceding months. Likewise, LCS-4B was not active for most of the past year; only readings since March 2015 were reported.

[1] The May 2015 Leachate Level Report (http://dnr.mo.gov/bridgeton/docs/leachatelevels050115.pdf) shows that the LCS-2D, LCS-3A and LCS-6B sumps maintained less than 30 feet of leachate over the past year, though there were no readings for LCS-2D since October 2014. Leachate levels were greater than 30 feet for LCS-1D,

Many of the chemicals found in your home can harm your health if you breathe them or accidentally eat or drink them. They can also harm the environment or pollute drinking water if they are not thrown away correctly.

Word Search

Volatile Organic Compounds (called VOCs) are smelly because they move quickly into the air we breathe. VOCs can also move quickly into our water. Search up, down, forward, backward and on the diagonal to find the VOCs hidden below. Cross off the VOCs once you find them to keep them from polluting the air and water.

H U S C N O Z M B O T P N G V
S H B B L R P T A H M A L S F
I K E P W H E N S I X B V U Y
L S R Z R A S K A U L C R Q K
O W J S R U T R P T A N K M U
P V O A D U I Z K N I H Q T H
L J H O D V C L U T W X X W Y
I Y S R N O I N U L R N H E I
A Z Z P J V D R Z Y K Q F V I
N C Y V K A E E D V B O H X C
R R E R Y F S S X B U C K Q U
C G V N D Q P H U B A J F T F
F D N I V P T I E E T U U Y Z
E N I L O S A G L R T W L Y D
J A E C T H M B P A I N T D D

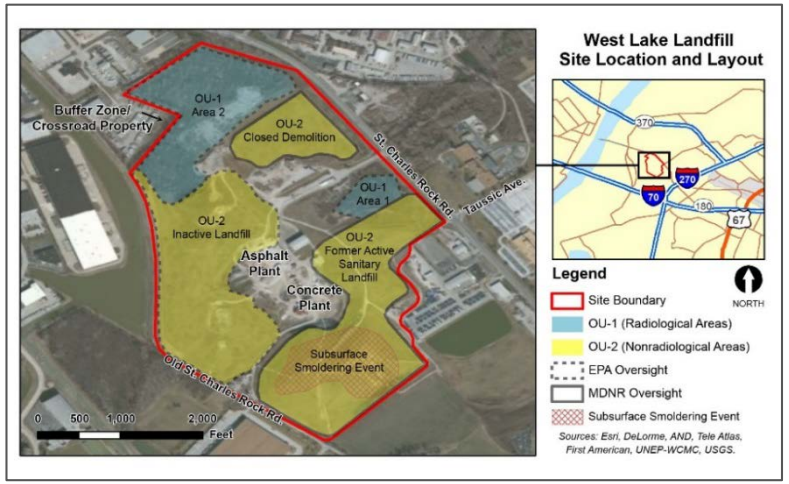
PAINT
NAIL POLISH
PESTICIDES
EXHAUST
GASOLINE
FURNITURE
BLEACH

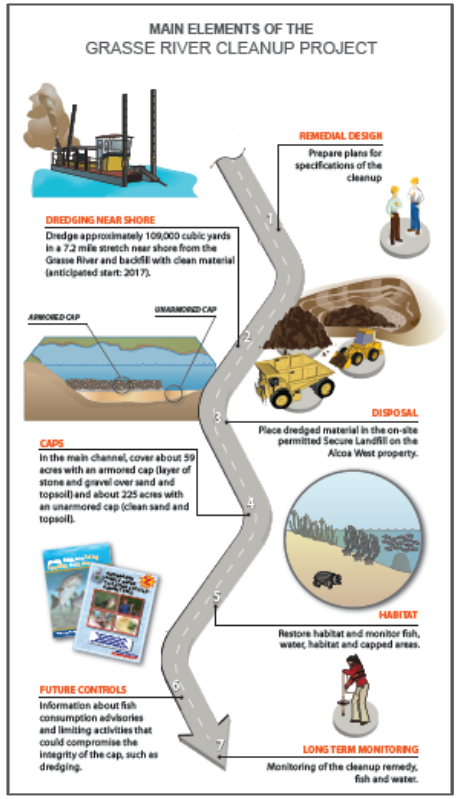
Once you find the words, ask your parents if you have any of these in your home that can be recycled. If so, you and your parents can safely throw away chemicals and electronic waste at special collection days near you.

For a calendar of upcoming waste collection events, check out this link: www.lacsd.org/solidwaste/swfacilities/recyclecontact/hhw_e_waste/

Below are some things that you can bring to the collection days:

- *Automobile fluids and batteries*
- *Paints*
- *Household cleaners*
- *Pesticides*
- *Electronics*



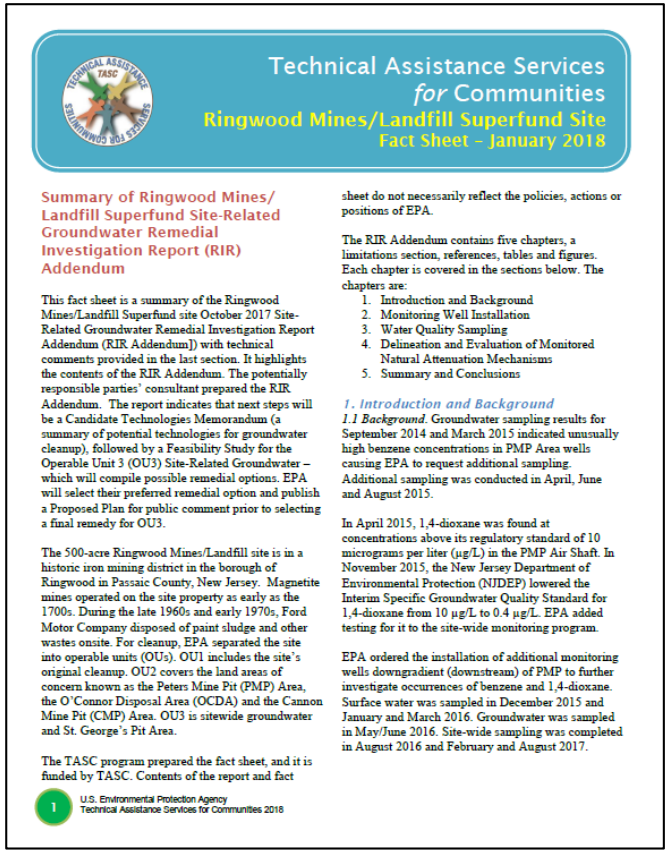


RIR ADDENDUM SUMMARY

This presentation is funded by EPA's Technical Assistance Services for Communities (TASC) program. Its contents do not necessarily reflect the policies, actions or positions of EPA

SUMMARY OF RIR ADDENDUM

- Five Chapters
  1. Introduction and Background
  2. Monitoring Well Installation
  3. Water Quality Sampling
  4. Delineation and Evaluation of Monitored Natural Attenuation Mechanisms
  5. Summary and Conclusions



Technical Assistance Services *for* Communities

Ringwood Mines/Landfill Superfund Site

Fact Sheet – January 2018

Summary of Ringwood Mines/ Landfill Superfund Site-Related Groundwater Remedial Investigation Report (RIR) Addendum

This fact sheet is a summary of the Ringwood Mines/Landfill Superfund site October 2017 Site-Related Groundwater Remedial Investigation Report Addendum (RIR Addendum]) with technical comments provided in the last section. It highlights the contents of the RIR Addendum. The potentially responsible parties' consultant prepared the RIR Addendum. The report indicates that next steps will be a Candidate Technologies Memorandum (a summary of potential technologies for groundwater cleanup), followed by a Feasibility Study for the Operable Unit 3 (OU3) Site-Related Groundwater – which will compile possible remedial options. EPA will select their preferred remedial option and publish a Proposed Plan for public comment prior to selecting a final remedy for OU3.

The 500-acre Ringwood Mines/Landfill site is in a historic iron mining district in the borough of Ringwood in Passaic County, New Jersey. Magnetite mines operated on the site property as early as the 1700s. During the late 1960s and early 1970s, Ford Motor Company disposed of paint sludge and other wastes onsite. For cleanup, EPA separated the site into operable units (OUs). OU1 includes the site's original cleanup. OU2 covers the land areas of concern known as the Peters Mine Pit (PMP) Area, the O'Connor Disposal Area (OCDA) and the Cannon Mine Pit (CMP) Area. OU3 is sitewide groundwater and St. George's Pit Area.

The TASC program prepared the fact sheet, and it is funded by TASC. Contents of the report and fact sheet do not necessarily reflect the policies, actions or positions of EPA.

The RIR Addendum contains five chapters, a limitations section, references, tables and figures. Each chapter is covered in the sections below. The chapters are:

1. Introduction and Background
2. Monitoring Well Installation
3. Water Quality Sampling
4. Delineation and Evaluation of Monitored Natural Attenuation Mechanisms
5. Summary and Conclusions

1. Introduction and Background

1.1 Background. Groundwater sampling results for September 2014 and March 2015 indicated unusually high benzene concentrations in PMP Area wells causing EPA to request additional sampling. Additional sampling was conducted in April, June and August 2015.

In April 2015, 1,4-dioxane was found at concentrations above its regulatory standard of 10 micrograms per liter (µg/L) in the PMP Air Shaft. In November 2015, the New Jersey Department of Environmental Protection (NJDEP) lowered the Interim Specific Groundwater Quality Standard for 1,4-dioxane from 10 µg/L to 0.4 µg/L. EPA added testing for it to the site-wide monitoring program.

EPA ordered the installation of additional monitoring wells downgradient (downstream) of PMP to further investigate occurrences of benzene and 1,4-dioxane. Surface water was sampled in December 2015 and January and March 2016. Groundwater was sampled in May/June 2016. Site-wide sampling was completed in August 2016 and February and August 2017.

1 U.S. Environmental Protection Agency
Technical Assistance Services for Communities 2018

1. INTRODUCTION AND BACKGROUND

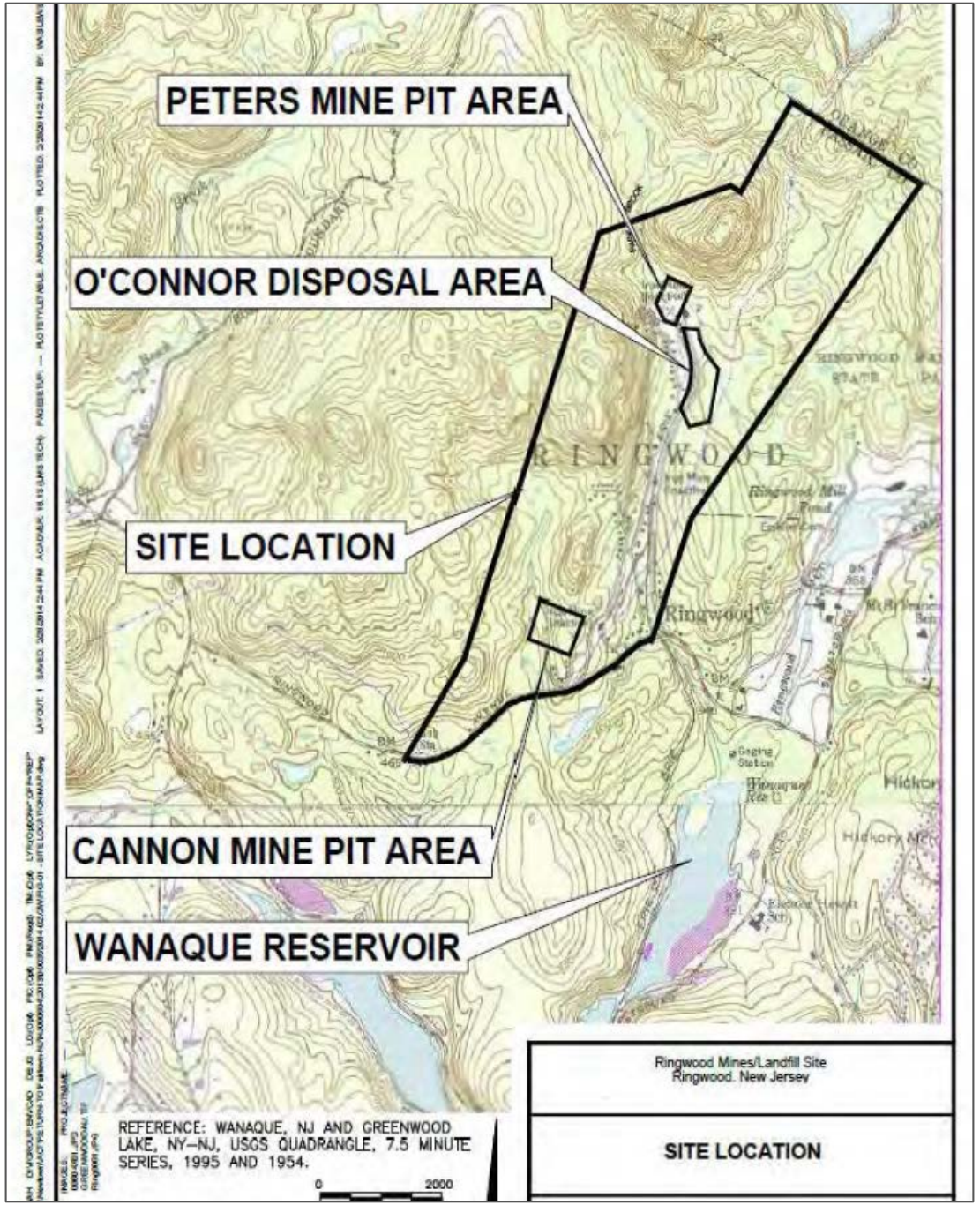
- 500-acre site is in historic iron-mining district
- Ford disposed of paint sludge and other wastes in late 1960s and early 1970s
- Operable units (OUs):
  - OU1 = originally intended to comprehensively address entire site
  - OU2 = land areas of concern – Peters Mine Pit (PMP) Area, O'Connor Disposal Area (OCDA) and Cannon Mine Pit (CMP) Area
  - OU3 = sitewide groundwater and St. George Pit Area
- Primary constituents of concern: benzene, chloroethane, 1,4-dioxane, arsenic and lead

RECENT ACTIVITIES

- High benzene concentrations were found in PMP Area monitoring wells in fall 2014 and spring 2015
- EPA ordered additional sampling
- 1,4-dioxane found in April 2015
- EPA ordered additional monitoring wells downgradient of PMP Area
- New Jersey changed groundwater quality standard for 1,4-dioxane from 10 micrograms per liter (µg/L) to 0.4 µg/L in November 2015

Ringwood Mines/Landfill Site Location

(Figure 1, Site's 2014 Record of Decision)



NORTH

Groundwater flow is generally down valley to the south and southeast

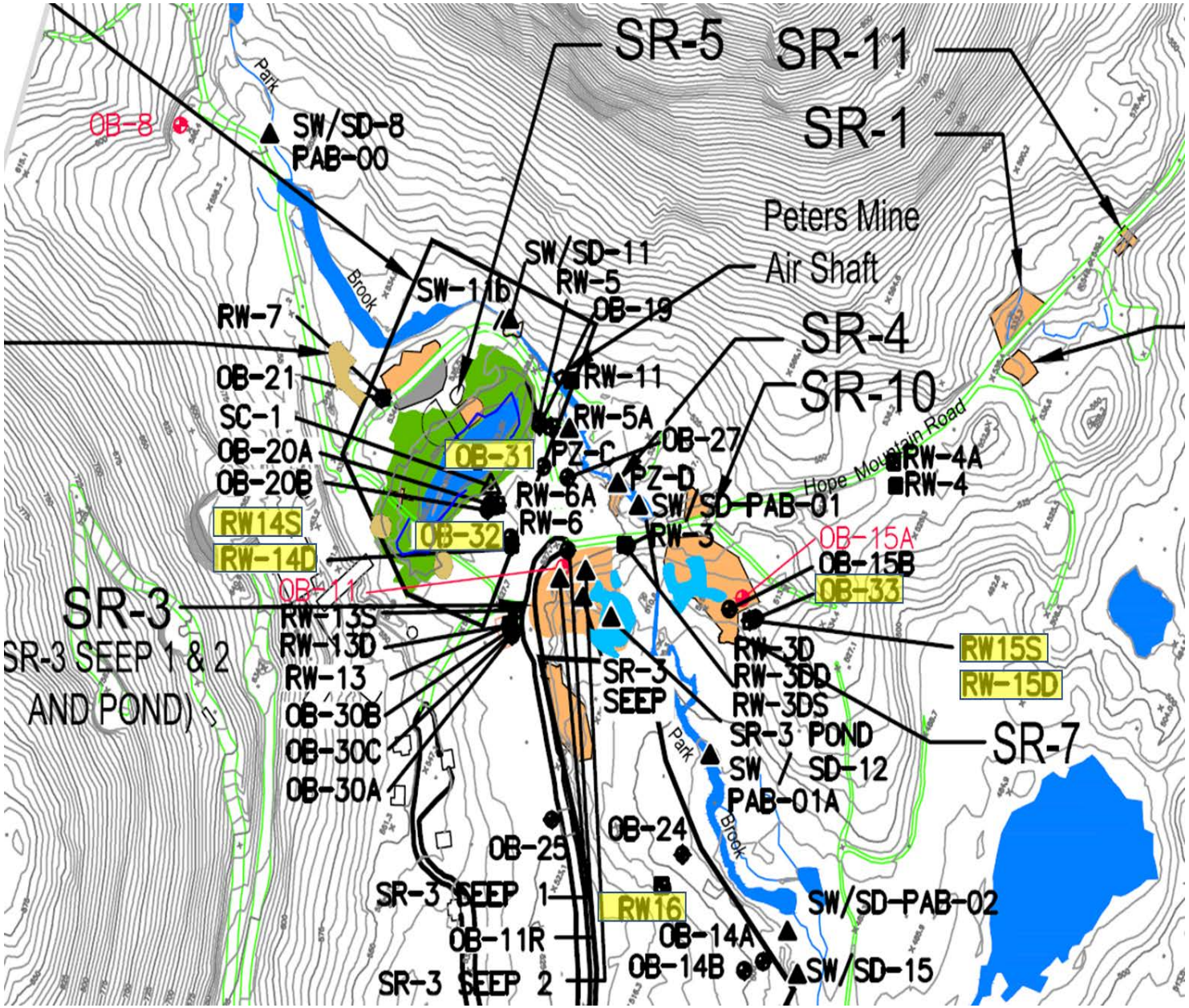
2. MONITORING WELL INSTALLATION

Overburden:
The soil and rock located above the bedrock

Table 1. New Monitoring Wells		
Monitoring Well ID	Total Well Depth (feet)	Open Hole or Screened Interval (feet below ground surface)
Overburden Wells		
OB-31	30	20-30
OB-32	20	10-20
OB-33	75	65-75
Bedrock Wells		
RW14S	153	135-155
RW-14D	185	175-185
RW15S	120	110-120
RW-15D	137	127-137
RW16	62	52-62

Locations of New Monitoring Wells

(Adapted from Figure 1 of the RIR Addendum)



3. WATER QUALITY SAMPLING

- March 2015 – August 2017 (Tables 2-7 of RIR Addendum)
  - 11 sampling events
  - Constituents of concern found above applicable standard:
    - Benzene – seven PMP Area wells; one CMP Area well; PMP Air Shaft; four surface water locations
    - Chloroethane – eight PMP Area wells; PMP Air Shaft
    - 1,4-dioxane – 17 PMP Area monitoring wells; two CMP Area wells; one OCDA well; PMP Air Shaft; CMP Shaft
    - Arsenic – PMP Area wells, CMP Area wells, the OCDA, Sally's Pond, PMP Air Shaft and CMP Shaft; 13 surface water locations
    - Lead – one PMP Area well, PMP Air Shaft and CMP Air Shaft; two surface water seeps

4. DELINEATION AND EVALUATION OF MONITORED NATURAL ATTENUATION MECHANISMS

- Software called BIOCHLOR modeled reduction of 1,4-dioxane in groundwater
  - No evidence of biodegradation
  - Model indicates 1,4-dioxane concentration will be below the groundwater standard at the site boundary due to dilution and mixing

TRANSPORT OF 1,4-DIOXANE IN SURFACE WATER

- Detections range from non-detect to 4.78 µg/L in a seep
- Highest concentration measured in a stream was 2.32 µg/L, in Park Brook next to the OCDA
- Focused study of the OCDA did not find a source and no source was found in 15 PMP Area soil borings
- Not detected in Park Brook downstream of Sally's Pond
- Not expected to be transported off site in surface water in the future

5. SUMMARY AND CONCLUSIONS

- Data collected since March 2015 continue to support conclusions presented in 2015 Groundwater Remedial Investigation Report
- Sufficient investigation has been done to proceed with Candidate Technologies Memorandum followed by feasibility study

5. SUMMARY AND CONCLUSIONS

- Benzene concentration spikes in PMP Area were not representative of groundwater quality
- Benzene concentrations are low and limited to immediate vicinity of the PMP Area
- Chloroethane concentrations are well below EPA's Regional Screening Level for tap water (21,000 µg/L)

5. SUMMARY AND CONCLUSIONS

- 1,4-dioxane in groundwater sufficiently characterized for completion of a feasibility study
  - Concentrations are highest at 230 feet below ground surface in PMP Air Shaft and decrease with shallower depths and with distance from PMP Air Shaft
  - BIOCHLOR modeling indicates that 1,4-dioxane will decrease to less than its Interim Specific Groundwater Quality Standard of 0.4 µg/L downgradient of the PMP Area and within site boundaries
  - 1,4-dioxane is reported in surface water samples in the PMP Area, with lower concentrations near the OCDA but not downstream of Sally's Pond.

5. SUMMARY AND CONCLUSIONS

- Arsenic and lead are naturally occurring metals; they are also associated with paint waste
  - Results are affected by particulates in groundwater samples as well as by fluctuations in groundwater geochemistry, specifically oxidation-reduction and pH

TASC COMMENTS

TASC COMMENTS

- The following technical comments are based on TASC's independent review and are provided for the use of the community
- TASC does not submit comments to EPA on behalf of the community. The comments reflect the opinions of the reviewers and may not reflect the policies, actions or positions of EPA
- TASC has identified some questions the community may wish to consider asking. These are identified in the following slides in text boxes

PERMEABLE SOIL COVER FOR THE OCDA

- Little evidence of groundwater impacts
- Only manganese, iron and arsenic found above groundwater standards in dissolved form

- Ask EPA to conduct leachability tests for metals
- Ask EPA if any soil/debris encountered during construction can be excavated and disposed of off site

POTENTIAL FOR VAPOR INTRUSION

- EPA includes 1,4-dioxane in its Vapor Intrusion Screening Level (VISL) calculator

- Ask EPA whether further evaluation of 1,4-dioxane via the vapor intrusion pathway is warranted

GROUNDWATER FLOW PATHWAYS

- Report overgeneralizes groundwater flow
  - From deeper bedrock to shallower bedrock to the overburden
- Downward flows reported for RW-3, RW-4 and some CMP wells

- TASC suggests the community ask EPA for further clarification of groundwater flow paths in the deep bedrock
- Ask EPA if flow characteristics were determined in new 2015 wells and are consistent with 2015 remedial investigation findings

1,4-DIOXANE AND NEED FOR SENTINEL WELLS

- Appears to be little risk of site contaminants affecting drinking water from the Wanaque Reservoir
- 1,4-dioxane contamination is not properly defined in the bedrock; it is not clear whether it extends off site

- Ask EPA to consider further defining concentrations of 1,4-dioxane in deeper groundwater
- TASC suggests the community to ask EPA to consider installing sentinel wells at the site boundary to detect any future risk to reservoir water quality

PROTECTIVE LEVEL FOR 1,4-DIOXANE IN SURFACE WATER

- There is no New Jersey surface water quality standard for 1,4-dioxane; therefore, the report compares detected concentrations to the ecological screening level (22,000 µg/L)

- Ask EPA to clarify how this is protective of human receptors and the drinking water reservoir downstream

BIOCHLOR MODEL

- Further discussion of the assumptions and limitations of the BIOCHLOR model may be needed because of
  1. Complicated groundwater flow at the site
  2. Varied depths of 1,4-dioxane contamination

- Ask EPA to review use of BIOCHLOR model for decision-making

1,4-DIOXANE LEVELS IN SOIL

- Did not see 1,4-dioxane as an analyte in the ODCA and CMP Area remedial investigation reports
- A focused investigation in the OCDA did not indicate a discrete source of 1,4-dioxane in the fill/waste

- Ask EPA if any additional focused investigation for 1,4-dioxane in soils is needed to make sure source material is not overlooked

ROUTINE TESTING OF DRINKING WATER

- North Jersey District Water Supply Commission 2017 Consumer Confidence Report does not list specific volatile organic compounds (VOCs) such as site constituents of concern – benzene, chloroethane and 1,4-dioxane

- Ask North Jersey District Water Supply Commission whether drinking water is or can be routinely sampled for these constituents

MEMORANDUM OF CANDIDATE TECHNOLOGIES

MEMORANDUM OF CANDIDATE TECHNOLOGIES

- Purpose
  - Identify candidate remedial action technologies and approaches for OU3 Site-Related Groundwater to be further considered in Feasibility Study (FS)

GENERAL RESPONSE ACTIONS IDENTIFIED

- No action (required alternative)
- Monitored Natural Attenuation (MNA) with a groundwater use restriction
- In-situ (in place) treatment of groundwater in PMP Area and/or downgradient
- Groundwater extraction and treatment in PMP Area and downgradient
  - Discharge onsite or recirculate to site groundwater

PMP AIR SHAFT TECHNOLOGIES CONSIDERED

1. No Action
2. Oxygen Diffusion via Chemical Addition in the PMP Air Shaft
   - Install several canisters containing calcium or magnesium peroxide in a solid form at various depths
3. Closure/Treatment in the PMP Air Shaft
   - Permanent closure of the PMP Air Shaft by sealing the entire shaft
   - Placement of granulated active carbon and resin adsorbents in base of air shaft

PMP AIR SHAFT TECHNOLOGIES CONSIDERED

4. In-Situ Chemical Oxidation in the PMP Air Shaft
   - Inject a sodium persulfate solution into various depths
   - *Will not be considered in Feasibility Study*
5. Biosparging of the PMP Air Shaft
   - Inject air into the subsurface
   - *Will not be considered in Feasibility Study*

PMP AREA TECHNOLOGIES CONSIDERED

1. No Action
2. MNA with groundwater use restriction
3. Optimized MNA
   - Includes additional monitoring wells downgradient of the PMP Area
4. Enhanced MNA
   - Includes injection of oxygen, sulfate or nitrate, and/or nutrients to enhance natural biodegradation of benzene (could enhance 1,4-dioxane biodegradation too)

PMP AREA TECHNOLOGIES CONSIDERED

5. In-Situ Chemical Oxidation
   - *Will not be considered in Feasibility Study*
6. Air Sparge/Soil Vapor Extraction
   - *Will not be considered in Feasibility Study*
7. Groundwater Extraction and Treatment (Discharge or Recirculate to Groundwater)
   - *Will not be considered in Feasibility Study*

CMP AREA TECHNOLOGIES CONSIDERED

1. No Action
2. MNA with groundwater use restriction

OCDA AREA TECHNOLOGIES CONSIDERED

1. No Action
2. MNA with groundwater use restriction

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